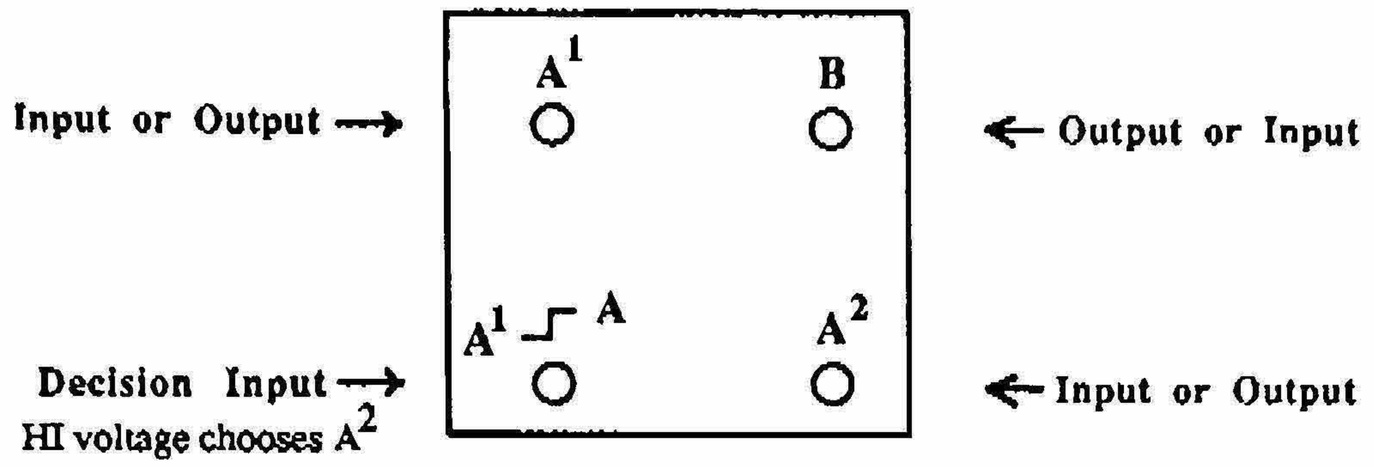
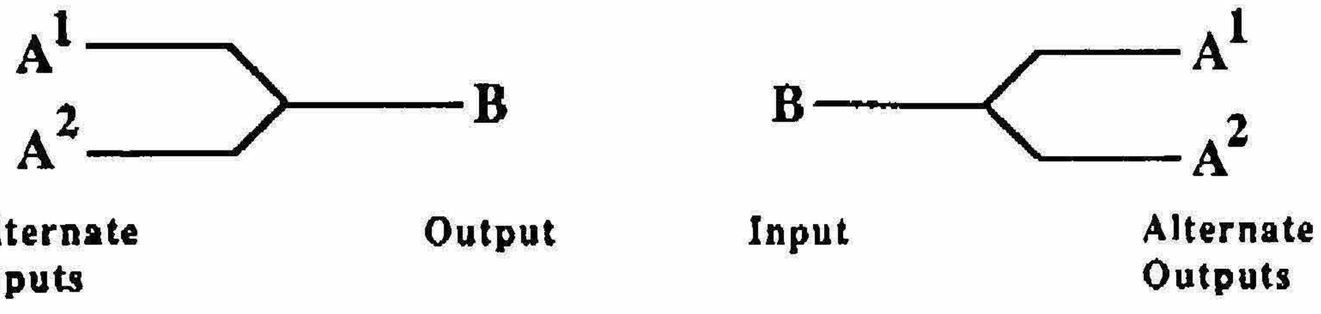
Serge Modular Synthesizer

by Bill Eldridge, 1989

Bi-Directional Router

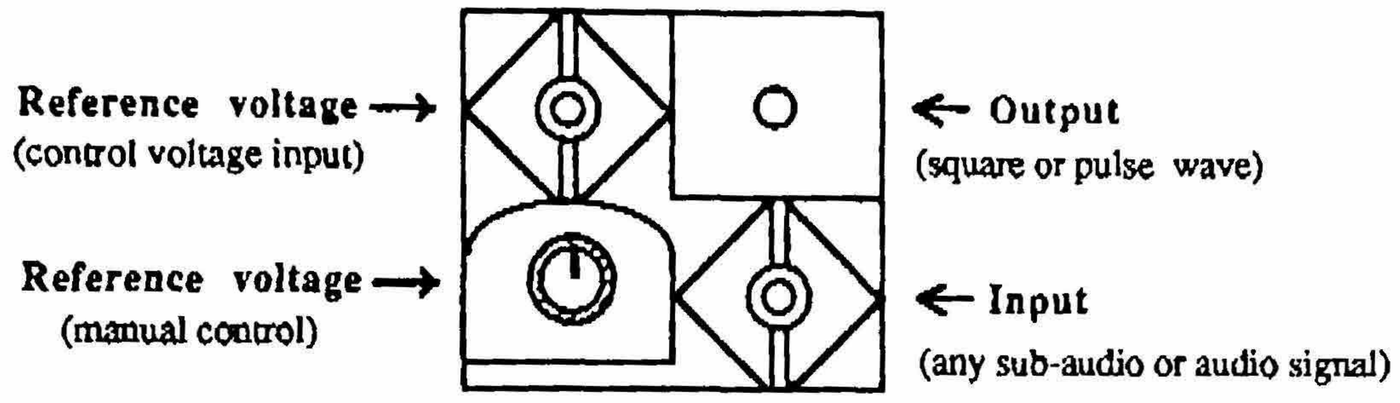


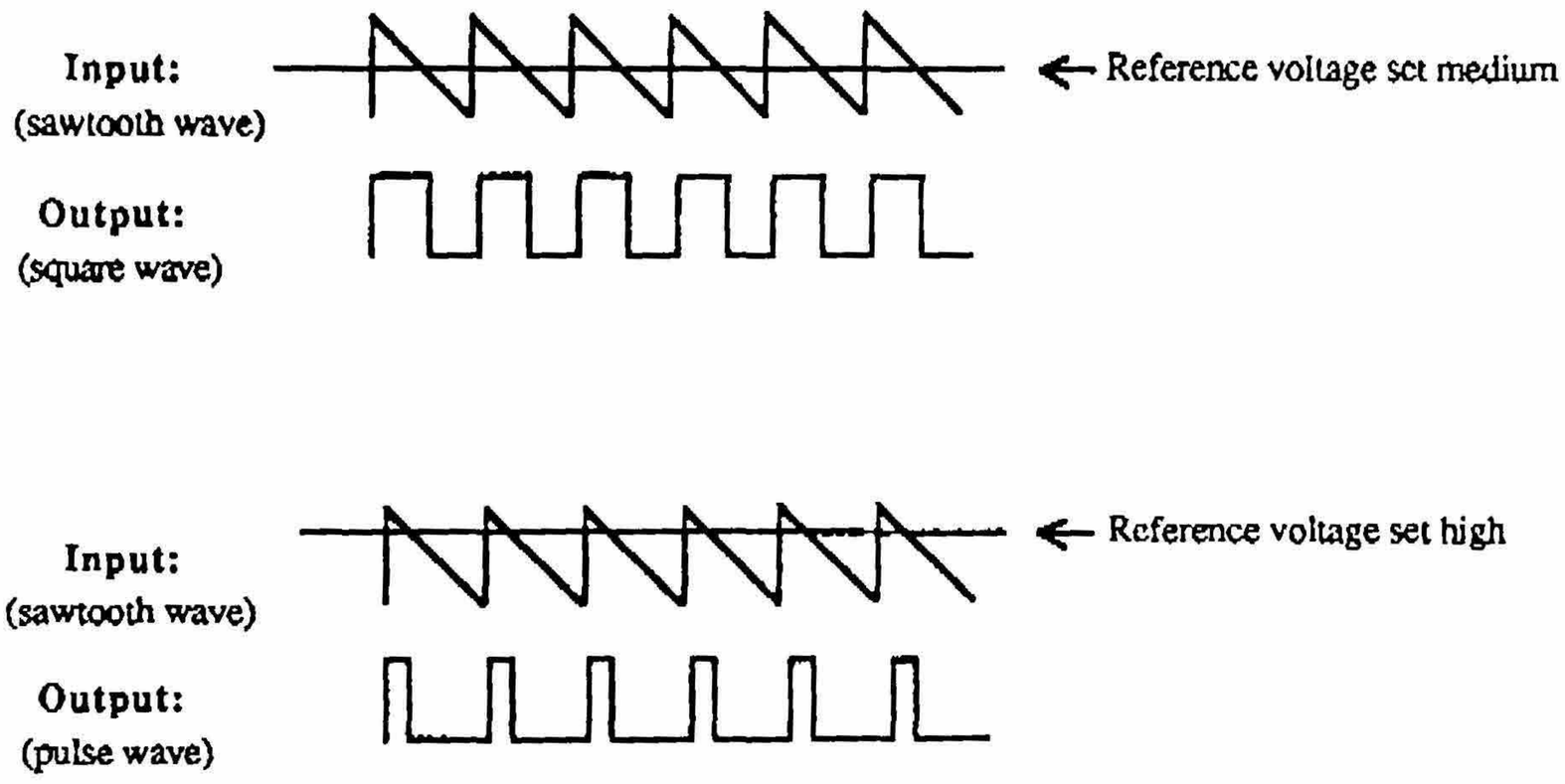


Warning: Not good for routing audio signals - clicks when switched

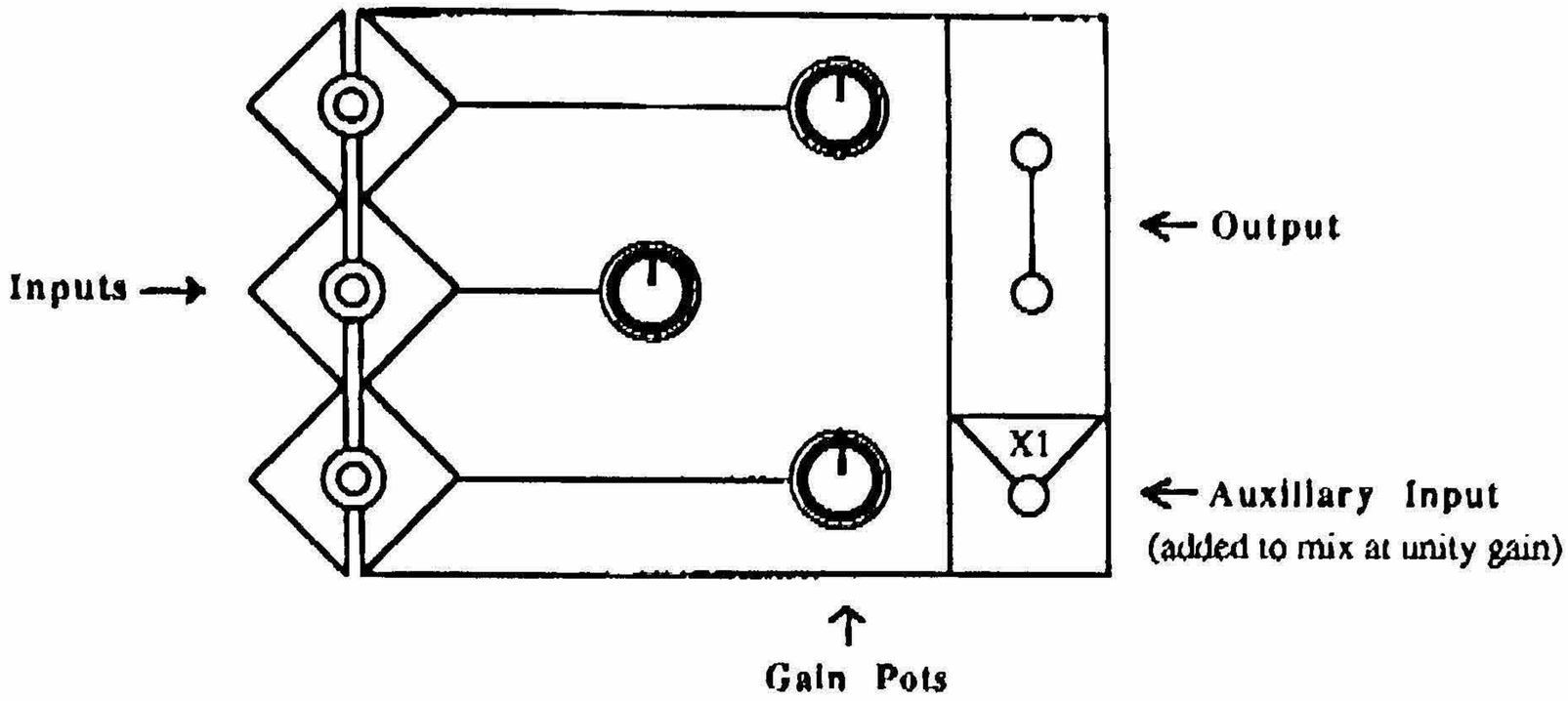
Comparator

Converts any wave shape into a square or pulse wave



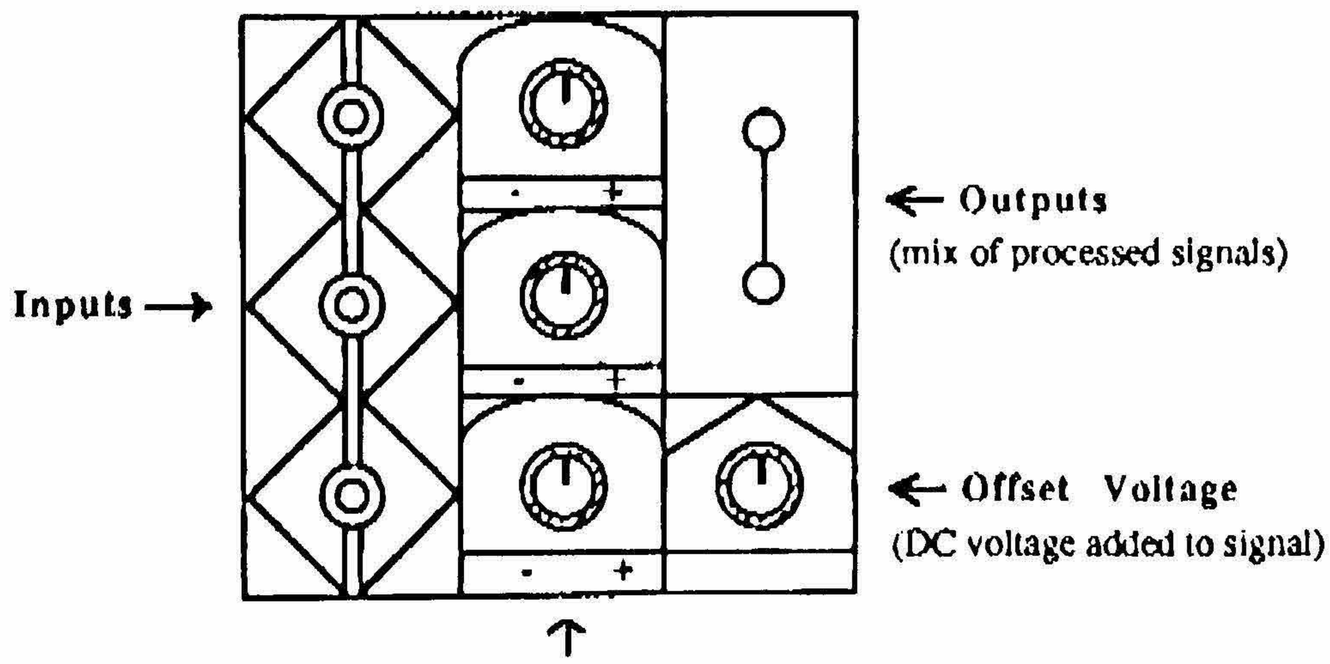


Dual Mixer

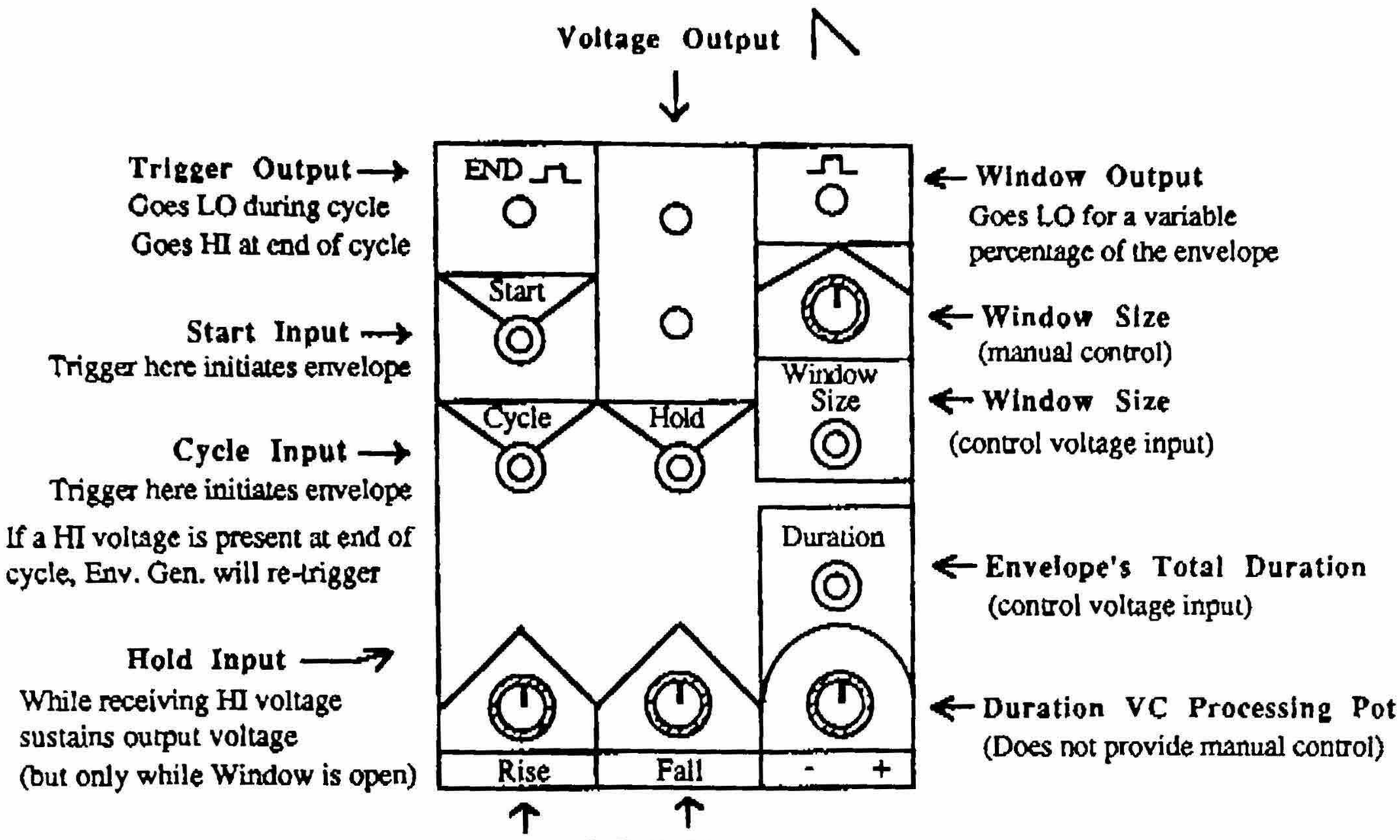


Note: The mixer INVERTS signals. Before viewing the output on an oscilloscope, pass the signal through a second mixer to re-invert it.

Dual Processor



Envelope Generator

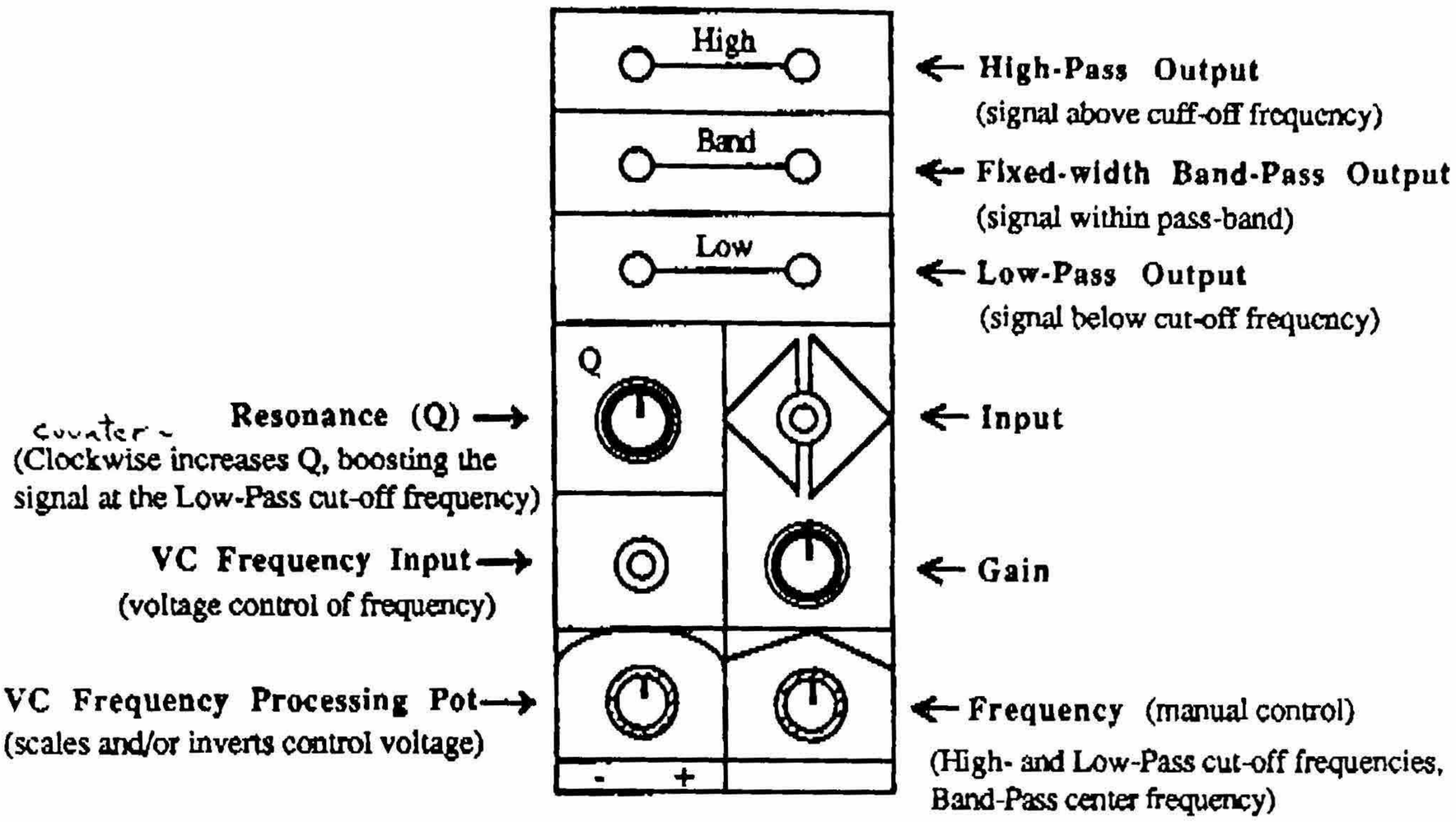


1) Patching Trigger Out to Start or Cycle will cause Envelope Generator to oscillate

2) The Envelope Generator cannot be re-triggered until it completes its cycle

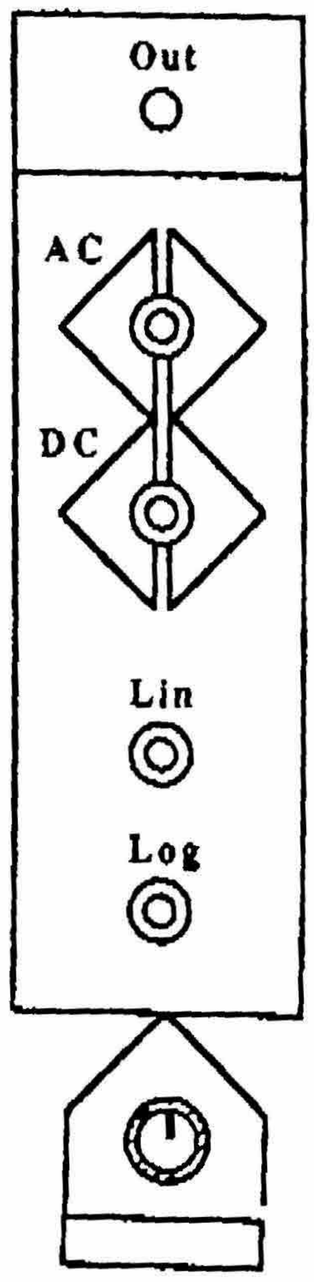
3) Setting the Envelope slower then a pulse train applied to the Start Input produces subharmonics (a new cycle is triggered every 2nd, 3rd, 4th... n pulse)

Filter


High
Band
Low
Q
- +
← High-Pass Output
(signal above cuff-off frequency)
← Fixed-width Band-Pass Output
(signal within pass-band)
← Low-Pass Output
(signal below cut-off frequency)
Resonance (Q) →
(Clockwise increases Q, boosting the signal at the Low-Pass cut-off frequency)
← Input
VC Frequency Input →
(voltage control of frequency)
← Gain
VC Frequency Processing Pot →
(scales and/or inverts control voltage)
← Frequency (manual control)
(High- and Low-Pass cut-off frequencies, Band-Pass center frequency)

Gate

Voltage Controlled Amplifier (VCA)



← **Input**
(for audio signals)

← **Input**
(for control signals)

←**VC Input (linear response)**
(for voltage control of signal amplitude)

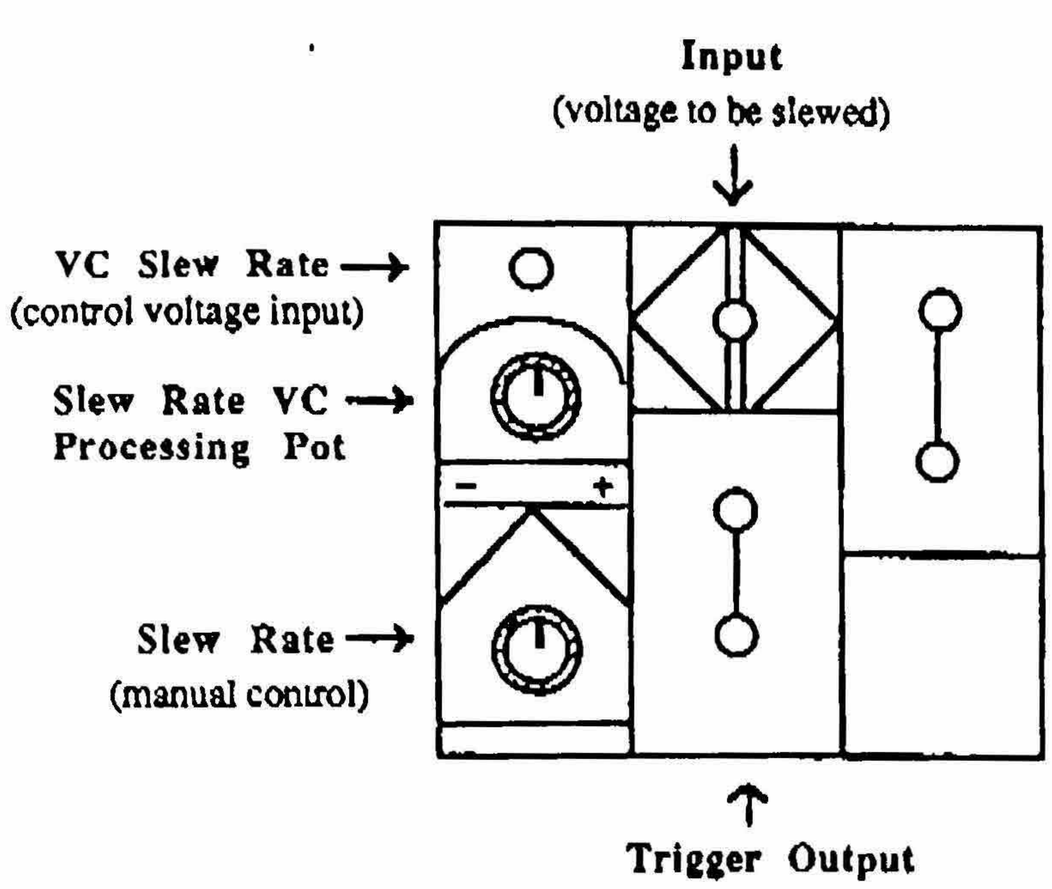
←**VC Input (logarhythmic response)**
(for voltage control of signal amplitude)
The Log Input is best for gating audio signals
(our ears respond to amplitude logarhythmically)

← usually scale the Gain back just enough so that no signal leaks through unless a control voltage (an envelope) opens the Gate

(manual control)

) inverted VC

Negative Slew



- Slews (slows) descending voltages

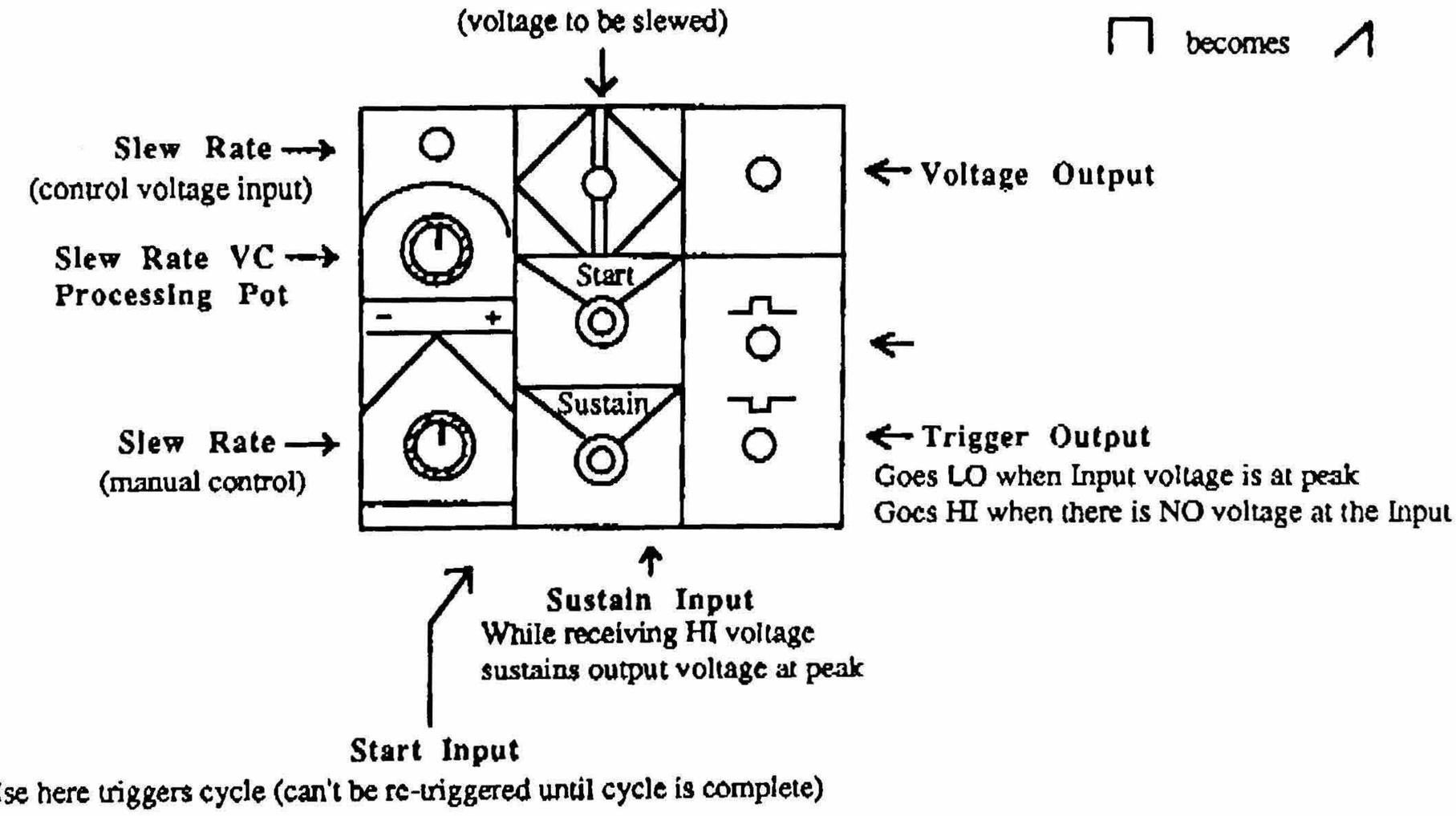
becomes

A Negative Slew can be:
- an audio oscillator
- a clock source
- a portamento control voltage processor
- a filter
- an envelope follower
- joined with a Positive Slew to make a DSG

Goes HI when there is NO voltage at the Input

Patching Trigger Out to Input will cause Neg. Slew to oscillate

Positive Slew



- Slews (slows) ascending voltages

becomes

Goes LO when Input voltage is at peak
Goes HI when there is NO voltage at the Input

Start Input

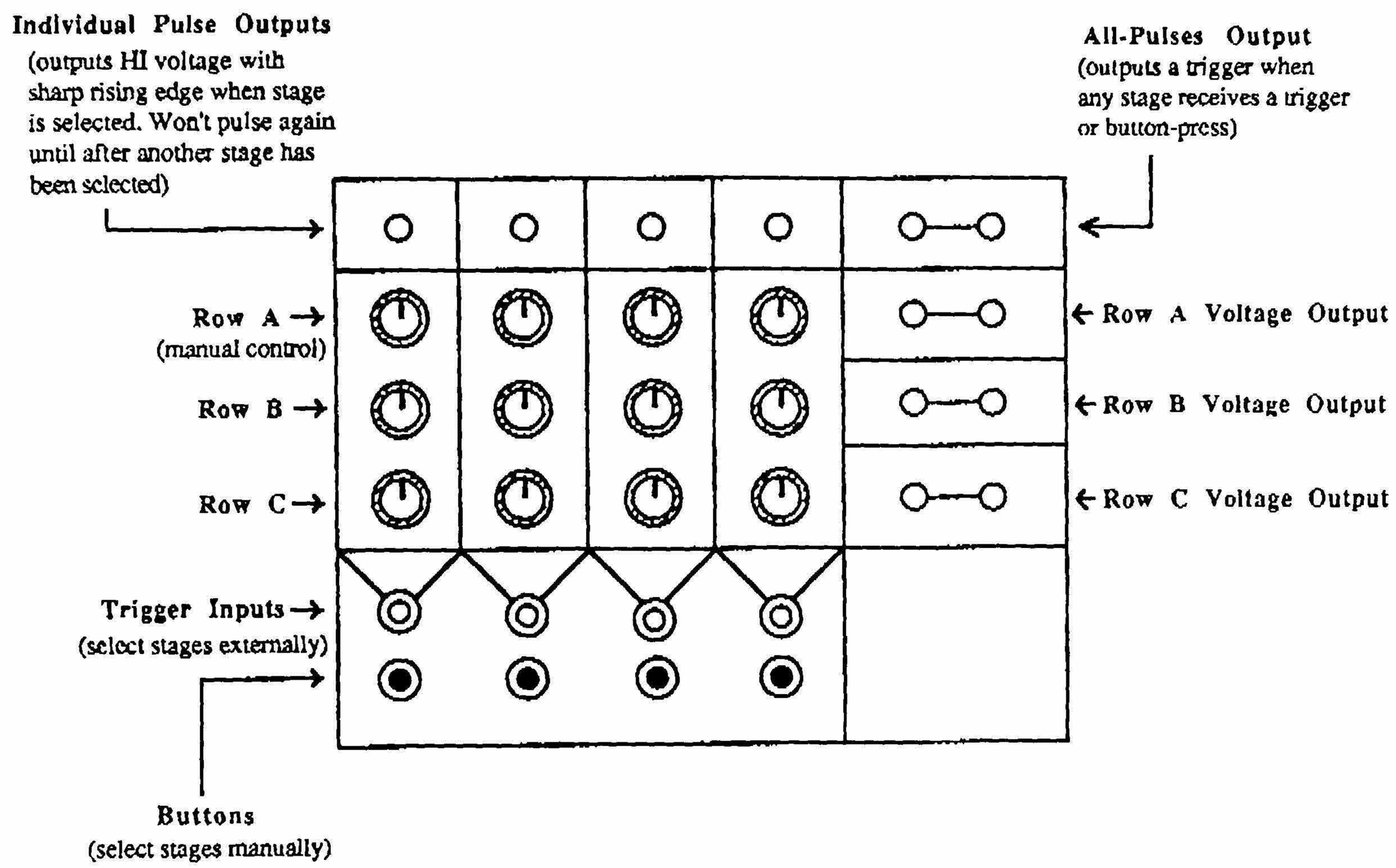
Pulse here triggers cycle (can't be re-triggered until cycle is complete)

Patching Trigger Output to Start Input causes Positive Slew to oscillate

Setting the Slew Rate slower than a pulse train applied to the Start Input produces subharmonics
(a new cycle is triggered every 2nd, 3rd, 4th... n pulse)

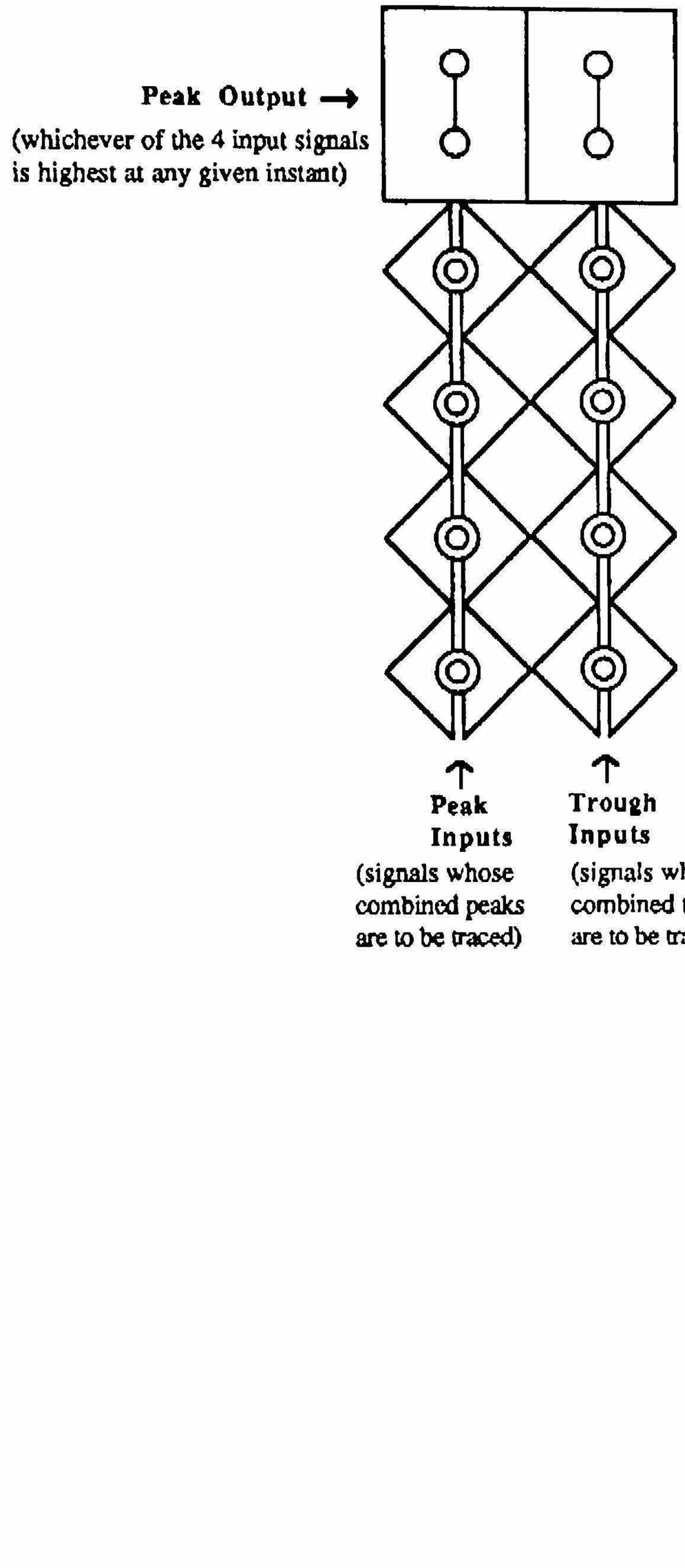
Programmer

Used in conjunction with a Trigger Sequencer, the Programmer can become a regular 4-stage, 3-row control voltage sequencer



Peak and Trough Tracer

- can be a non - linear audio mixer
- can be a control voltage adder



Peak Output →

(whichever of the 4 input signals is highest at any given instant)

← Trough Output

(whichever of the 4 input signals is lowest at any given instant)

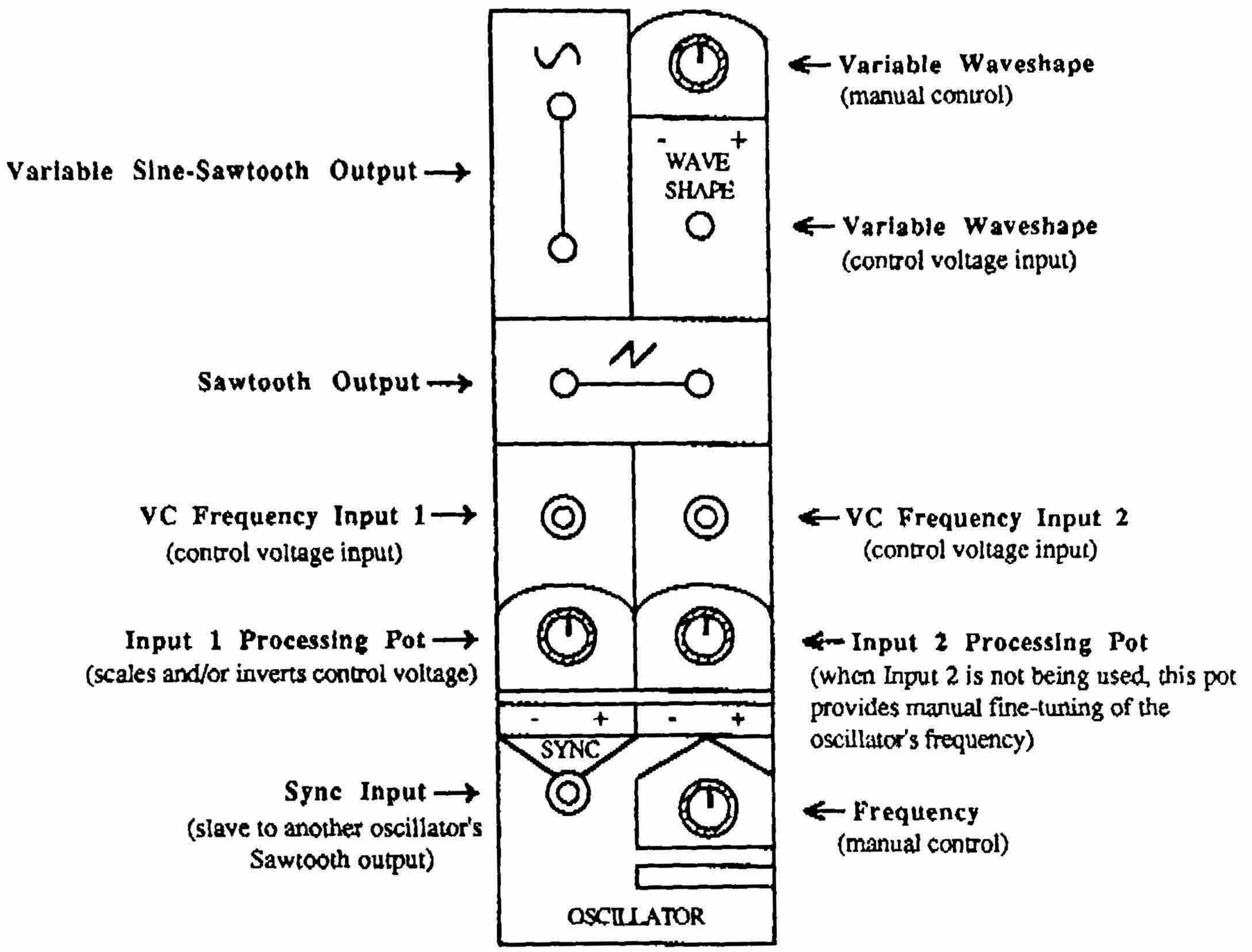
Peak Inputs

(signals whose combined peaks are to be traced)

Trough Inputs

(signals whose combined troughs are to be traced)

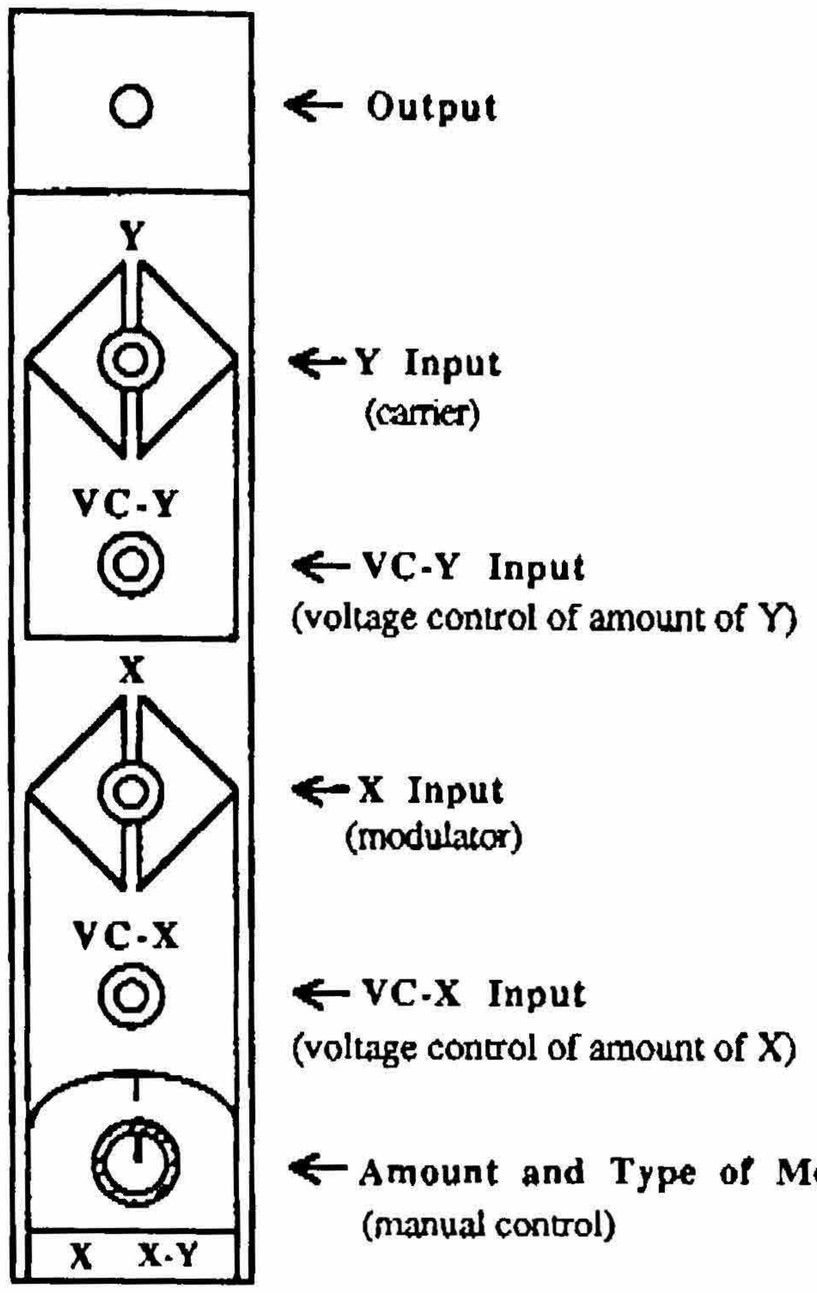
Oscillator



- The main panel oscillators have no 1-volt-per-octave inputs, but a 1-volt-per-octave response can be obtained by carefully adjusting the Processing Pots.

- Voltage-controlling the frequency while one oscillator is synced to another selects tones along the master oscillator's subharmonic and harmonic series.

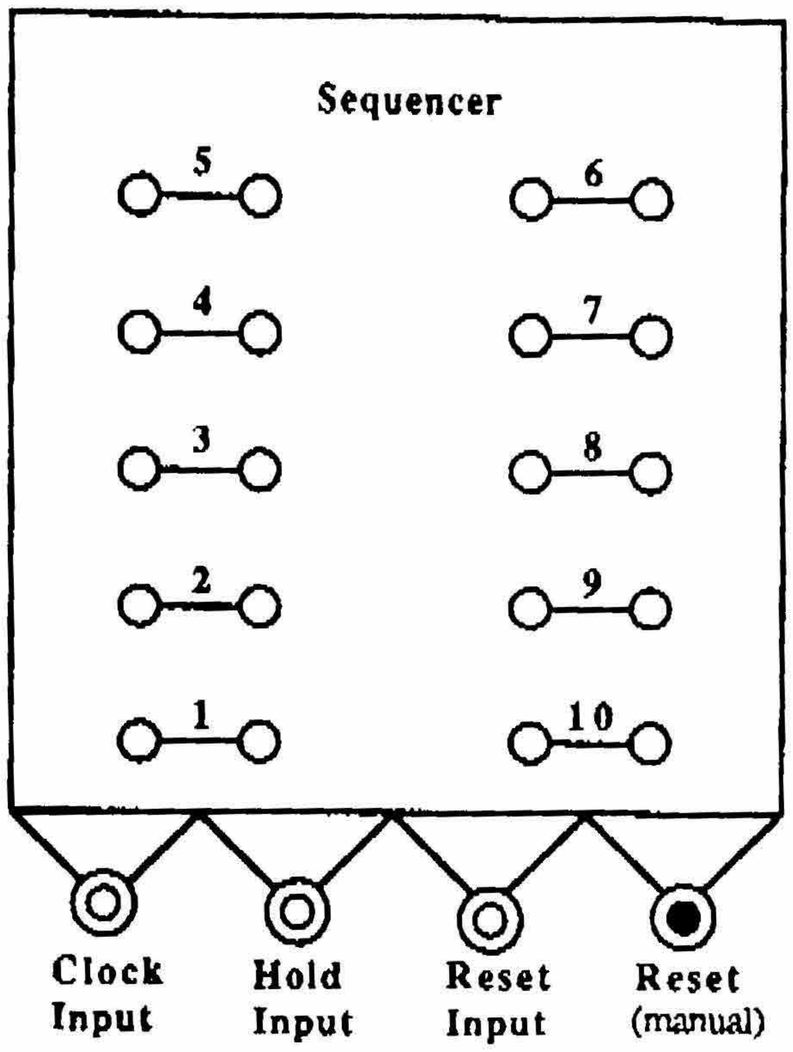
Ring Modulator



Amplitude Modulation (AM): Output contains modulator, carrier, sum and difference frequencies

Ring Modulation (RM): Output contains sum and difference frequencies
(modulator and carrier are suppressed)

Trigger Sequencer



Output Stages →

When an incoming Clock trigger advances the Sequencer to a new stage, that stage outputs a HI voltage with a sharp rising edge that can act as a trigger

A trigger applied to the Clock Input advances the Sequencer from one stage to the next →

← Pressing the Reset button resets the Sequencer to Stage 1

A trigger applied to the Reset Input resets the Sequencer to Stage 1

While a HI voltage is applied to the Hold Input, the Sequencer will not advance

Triple Waveshaper

For voltage-controlled distortion of input signal's waveshape